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Windauer

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(54) **LOCKING ADJUSTMENT KNOB FOR A SIGHTING DEVICE**

(75) Inventor: **Bernard T. Windauer**, Kalispell, MT (US)

(73) Assignee: **Leupold & Stevens, Inc.**, Beaverton, OR (US)

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(21) Appl. No.: **13/220,525**

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Related U.S. Application Data

(63) Continuation of application No. 11/720,428, filed as application No. PCT/US2005/043336 on Nov. 30, 2005, now Pat. No. 8,006,429.

(60) Provisional application No. 60/638,561, filed on Dec. 22, 2004, provisional application No. 60/632,331, filed on Nov. 30, 2004.

(51) **Int. Cl.**
F41G 1/38 (2006.01)

(52) **U.S. Cl.**
USPC **42/122**; 42/119

(58) **Field of Classification Search**
USPC 42/119, 120, 122, 124, 136, 138; 74/553
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

680,442	A *	8/1901	Schmitt	72/105
1,344,973	A	6/1920	Bader	
2,143,167	A *	1/1939	Pechar	42/126
2,165,796	A *	7/1939	Humeston	42/126
2,208,913	A *	7/1940	Unertl	42/126
2,229,637	A *	1/1941	Burton	42/137
2,336,107	A *	12/1943	Litschert	42/126
2,452,592	A *	11/1948	Meyer	33/298

(Continued)

FOREIGN PATENT DOCUMENTS

CN	2752794 Y	1/2006
DE	2 148 967	4/1973

(Continued)

OTHER PUBLICATIONS

Article: *Bayonet Mount*, Answers.com Encyclodictionalmanacapedia, http://www.answers.com/topic/bayonet-mount, visited Sep. 28, 2006, 2 pages.

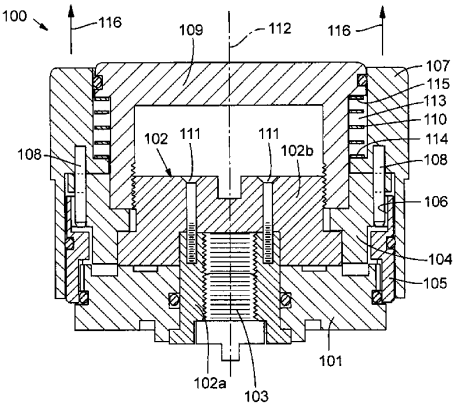
(Continued)

Primary Examiner — Michael David
(74) *Attorney, Agent, or Firm* — Stoel Rives LLP

(57) **ABSTRACT**

A locking turret knob includes an adjustment member, a first member, and a second member. The adjustment member is adjustably positionable about an axis of rotation. The first member is disposed in proximity to the adjustment member and has at least one engagement member. The second member is disposed in proximity to the adjustment member and has at least one engagement surface. The adjustment member is adjustably positionable about the axis of rotation when each engagement member does not engage an engagement surface. The adjustment member is locked in a selected position about the axis of rotation when at least one engagement member engages an engagement surface. The adjustment member can be coupled to an adjuster of an optical enhancement device, such as a telescopic sight, a telescope or a microscope.

29 Claims, 10 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

2,583,042	A	*	1/1952	Dayton	42/122
2,585,933	A		2/1952	Harvey	
2,682,707	A	*	7/1954	Dahlberg	42/137
2,913,826	A	*	11/1959	Petty	42/122
3,037,287	A		6/1962	Glatz at al.	
3,058,391	A	*	10/1962	Leupold	359/422
3,161,716	A	*	12/1964	Burris et al.	356/247
3,222,987	A	*	12/1965	Wrigglesworth	359/794
3,280,463	A	*	10/1966	Stadler	42/122
3,297,389	A	*	1/1967	Gibson	359/424
3,471,932	A		10/1969	Luning	
3,662,618	A		5/1972	Kroll et al.	
3,707,204	A		12/1972	Dussardier	
3,826,012	A		7/1974	Pachmayr	
3,916,721	A		11/1975	Egger	
3,990,155	A		11/1976	Akin, Jr. et al.	
3,999,442	A		12/1976	Decker et al.	
4,012,966	A		3/1977	Lieberman et al.	
4,026,397	A	*	5/1977	Raus	192/48.1
4,038,757	A		8/1977	Hicks et al.	
4,132,129	A	*	1/1979	Pratt	74/553
4,154,125	A	*	5/1979	Frank	74/553
4,200,355	A	*	4/1980	Williams, Jr.	359/424
4,201,096	A	*	5/1980	Morrison et al.	74/531
4,247,161	A		1/1981	Unertl, Jr.	
4,347,758	A	*	9/1982	Geil et al.	74/531
4,373,269	A	*	2/1983	Doliber et al.	42/122
4,389,791	A	*	6/1983	Ackerman	42/122
4,408,842	A	*	10/1983	Gibson	359/422
4,457,076	A		7/1984	Heck	
4,461,330	A	*	7/1984	Judkins	144/154.5
4,643,542	A	*	2/1987	Gibson	359/424
4,779,305	A	*	10/1988	Gorsek	16/441
4,955,253	A		9/1990	Sakai et al.	
4,982,502	A	*	1/1991	Weyrauch	42/122
5,020,389	A	*	6/1991	Sigler	74/553
5,083,477	A	*	1/1992	Geil	74/553
5,121,653	A	*	6/1992	Sigler	74/553
5,152,187	A	*	10/1992	LaFemina	74/553
5,329,829	A	*	7/1994	Sell	74/553
5,363,559	A	*	11/1994	McCarty	42/122
5,433,010	A	*	7/1995	Bell	42/126
5,499,456	A	*	3/1996	Tomita	42/122
5,513,440	A		5/1996	Murg	
5,586,569	A	*	12/1996	Hanning et al.	137/116.5
5,615,487	A	*	4/1997	Tomita	42/122
5,618,374	A	*	4/1997	Byerley	156/418
5,695,125	A	*	12/1997	Kumar	239/364
5,715,607	A	*	2/1998	Murg	42/123
5,745,287	A		4/1998	Sauter	
5,771,595	A	*	6/1998	Bell	42/122
5,862,715	A		1/1999	Lemire	
5,892,617	A		4/1999	Wallace	
5,906,141	A	*	5/1999	Abdelmoula	74/553
5,930,934	A	*	8/1999	Fisher et al.	42/119
6,005,711	A		12/1999	Mai et al.	
6,279,259	B1	*	8/2001	Otteman	42/122
6,351,907	B1	*	3/2002	Otteman	42/120
6,442,854	B1	*	9/2002	Liu et al.	33/286
6,508,144	B1		1/2003	Vendetti et al.	
6,519,890	B1	*	2/2003	Otteman	42/122
6,588,125	B2		7/2003	Proctor, Sr.	
6,643,970	B2	*	11/2003	Huber	42/122
6,691,447	B1	*	2/2004	Otteman	42/122
6,705,037	B2		3/2004	Van Kirk	
6,721,095	B2	*	4/2004	Huber	359/427
6,772,550	B1	*	8/2004	Leatherwood	42/119
6,848,628	B2	*	2/2005	Walker	239/16
6,860,442	B2		3/2005	Datcuk, Jr.	
6,862,832	B2		3/2005	Barrett	
7,117,624	B2	*	10/2006	Kim	42/85
7,121,037	B2		10/2006	Penney	
7,330,310	B2	*	2/2008	Hengst et al.	359/418
7,495,847	B2	*	2/2009	Thomas	359/811
7,934,335	B2	*	5/2011	Halverson	42/137
8,006,429	B2	*	8/2011	Windauer	42/122
8,033,464	B2	*	10/2011	Windauer et al.	235/404
8,132,351	B2	*	3/2012	Potterfield et al.	42/94
8,270,104	B2	*	9/2012	Windauer	359/821
8,356,442	B2	*	1/2013	Potterfield et al.	42/94
2003/0140545	A1	*	7/2003	Huber	42/122
2004/0088898	A1		5/2004	Barrett	
2006/0254115	A1	*	11/2006	Thomas et al.	42/122
2006/0268433	A1	*	11/2006	Thomas	359/811
2006/0278035	A1		12/2006	Casas	
2007/0240356	A1	*	10/2007	Klepp et al.	42/122
2008/0047189	A1	*	2/2008	Potterfield et al.	42/94
2008/0066364	A1	*	3/2008	Klepp et al.	42/122
2008/0236018	A1	*	10/2008	Halverson	42/135
2009/0205461	A1	*	8/2009	Windauer	74/553
2011/0100152	A1		5/2011	Huynh	
2011/0242650	A1	*	10/2011	Windauer	359/428
2011/0261449	A1		10/2011	Schmitt	
2012/0030988	A1	*	2/2012	Windauer	42/119
2012/0053878	A1	*	3/2012	Windauer et al.	702/94
2012/0167444	A1		7/2012	Adkins et al.	
2012/0186131	A1	*	7/2012	Windauer	42/122

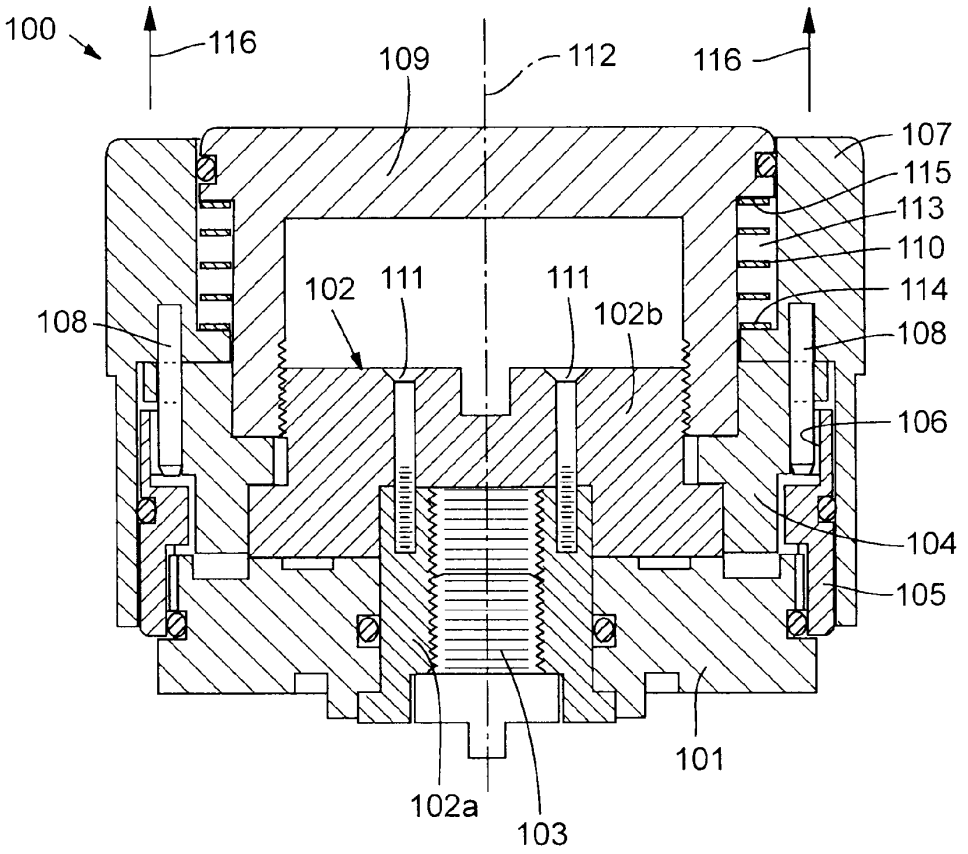
FOREIGN PATENT DOCUMENTS

DE	297 20 737	U1	2/1998
DE	299 03 989	U1	6/1999
DE	203 01 749	U1	4/2003
DE	102 22 528	A1	12/2003
DE	20 2006 003 770	U1	7/2006
GB	598306		2/1948
GB	708438		5/1954
GB	1102022		2/1968
GB	1214584		12/1970
GB	2213959	A	8/1989
JP	11-085290	A	3/1999
WO	WO 2006/060490	A2	6/2006
WO	WO 2006/109587	A1	10/2006

OTHER PUBLICATIONS

International Search Report and Written Opinion, International Patent Application No. PCT/US05/43336, mailed Jul. 7, 2008, 4 pages.

* cited by examiner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102a
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FIG. 1

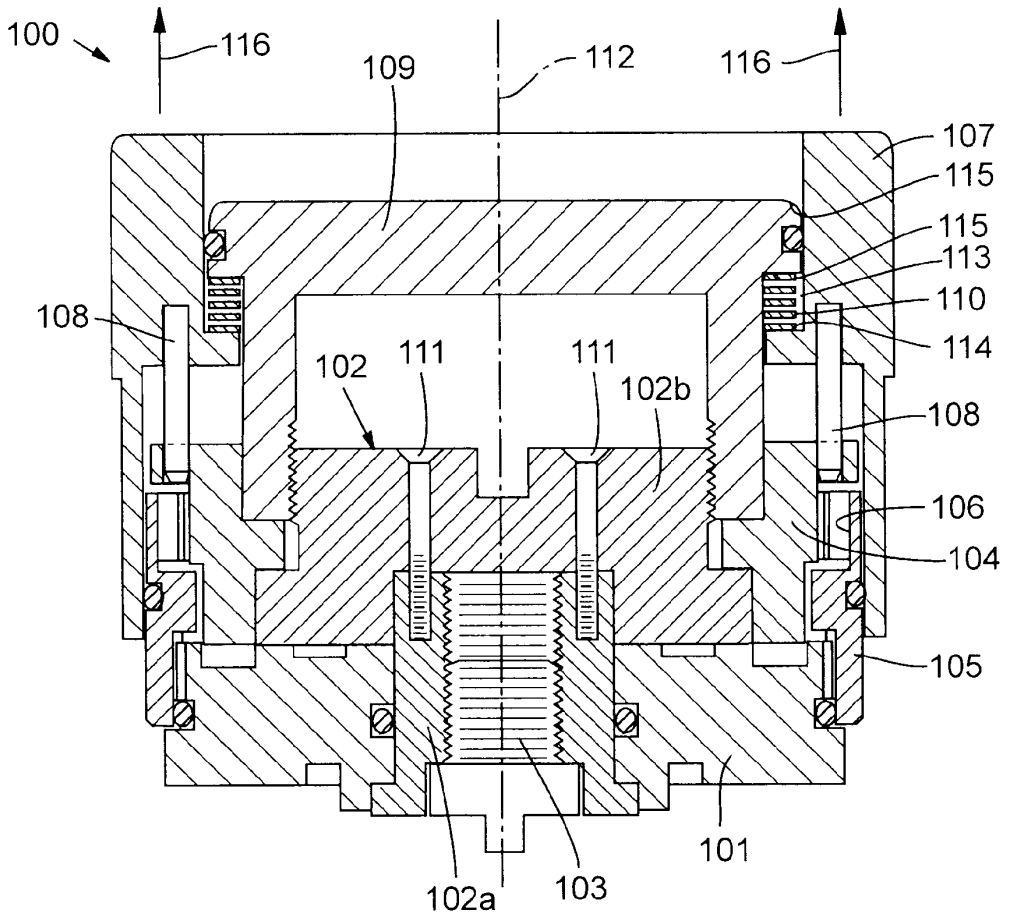
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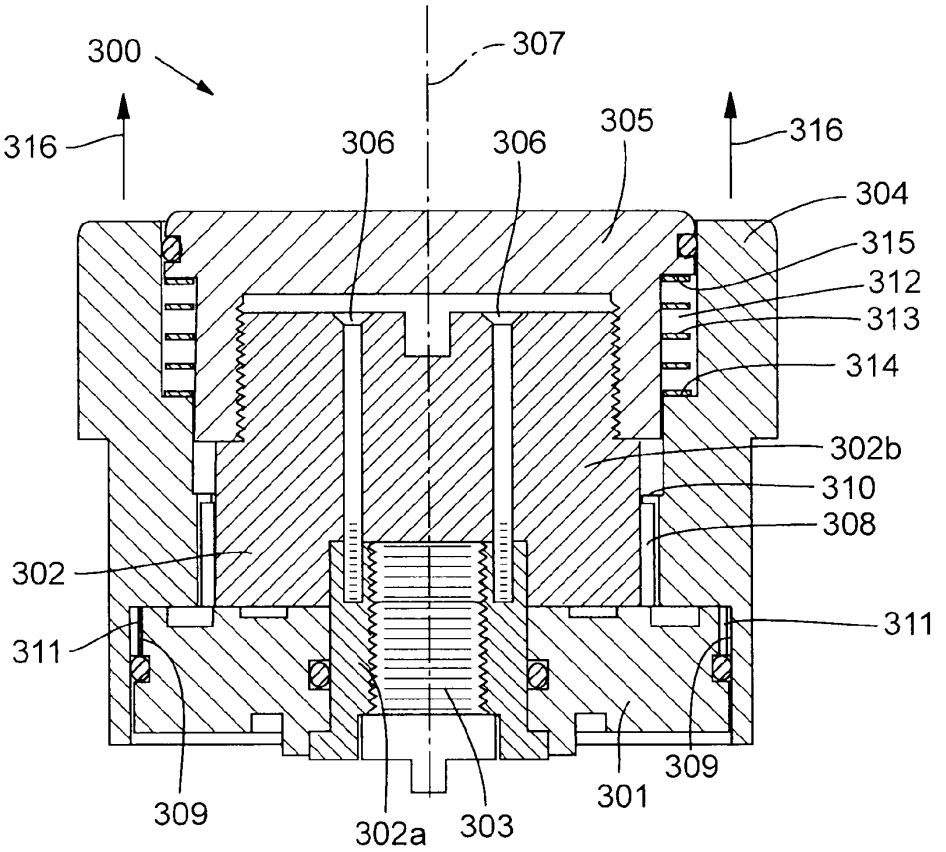
FIG. 2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302a
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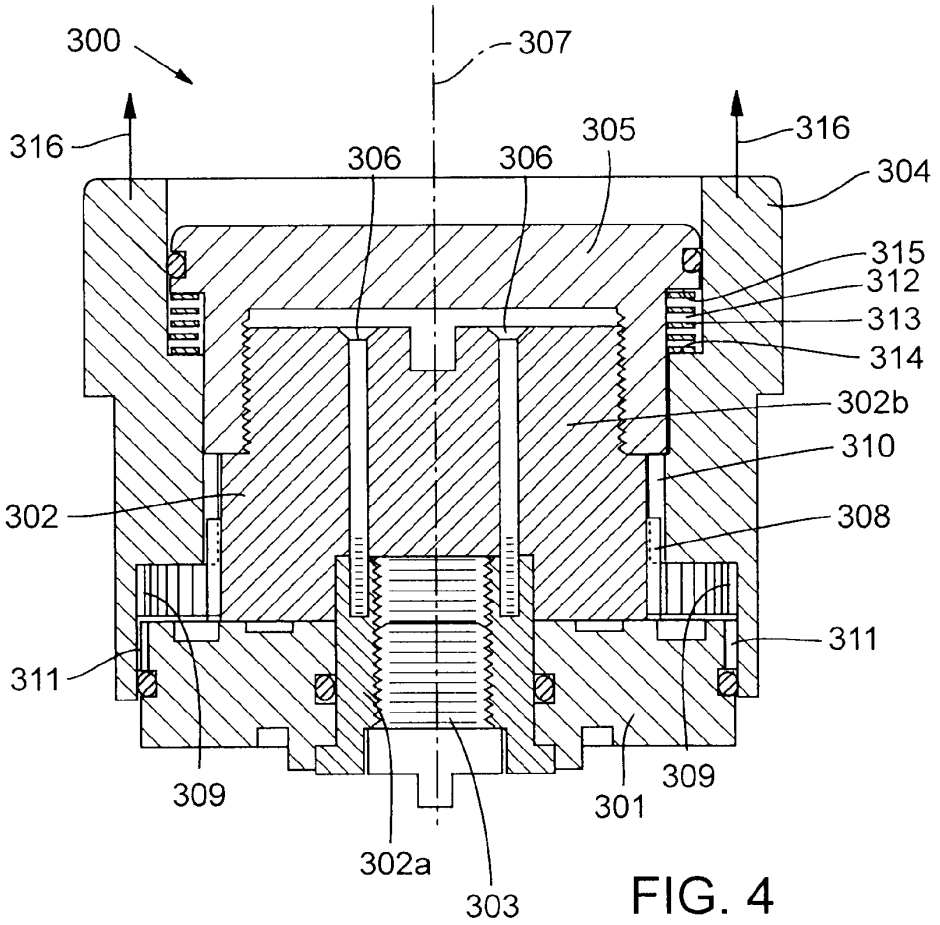
FIG. 3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302a
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FIG. 4

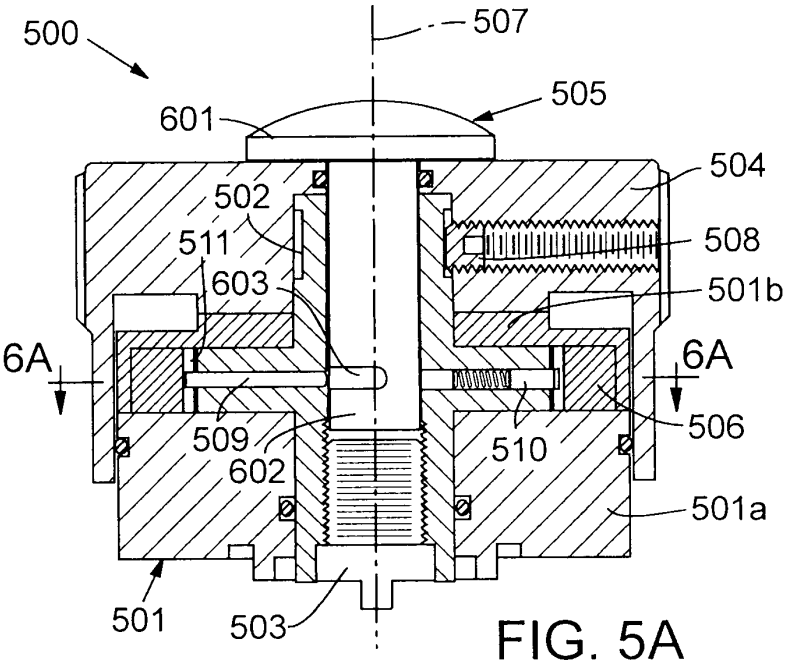
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FIG. 5A

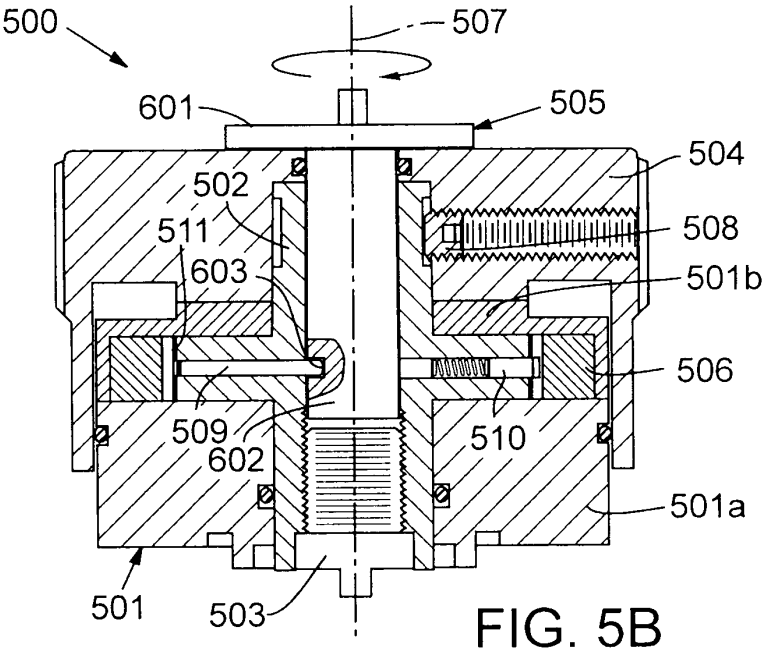
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FIG. 5B

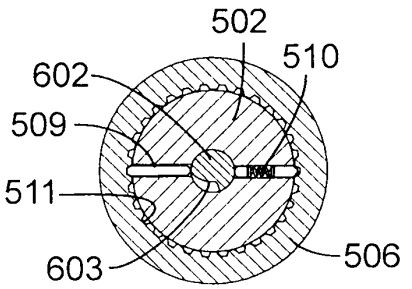

FIG. 6A

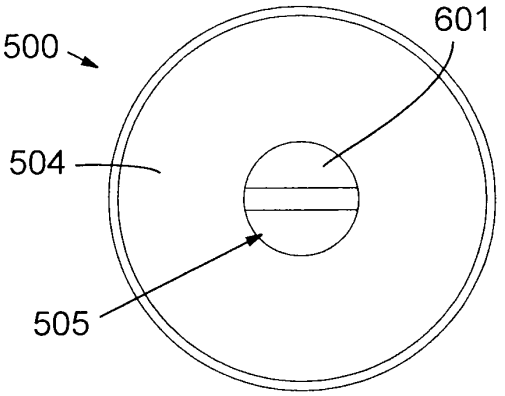

FIG. 6B

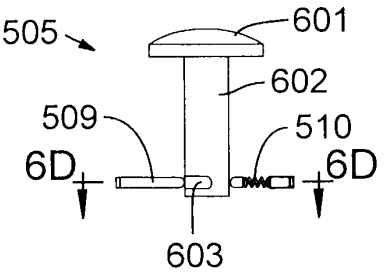

FIG. 6C

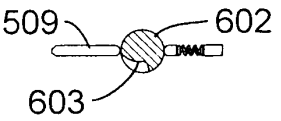

FIG. 6D

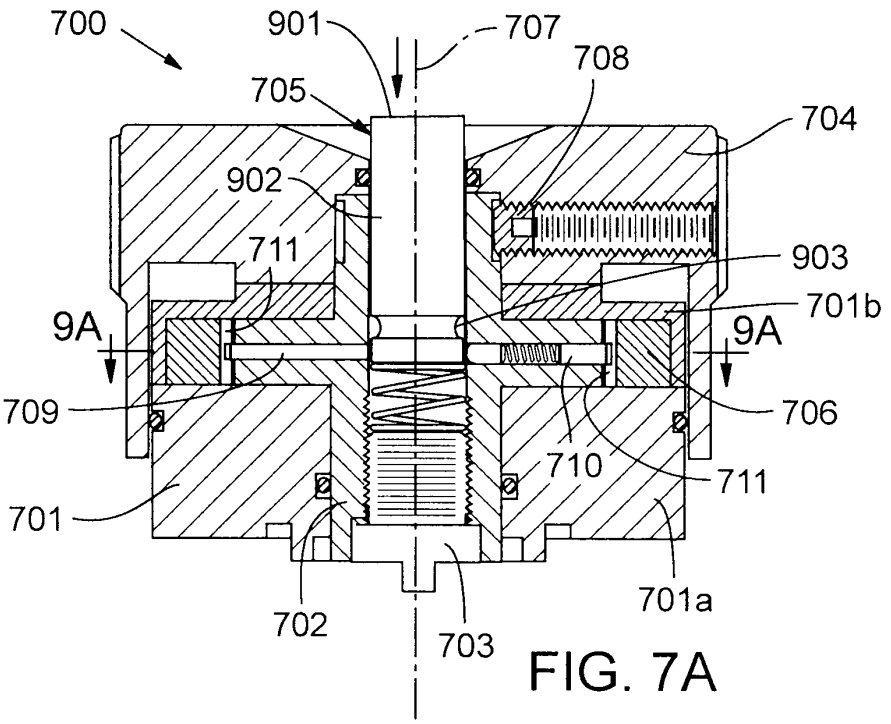
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FIG. 7A

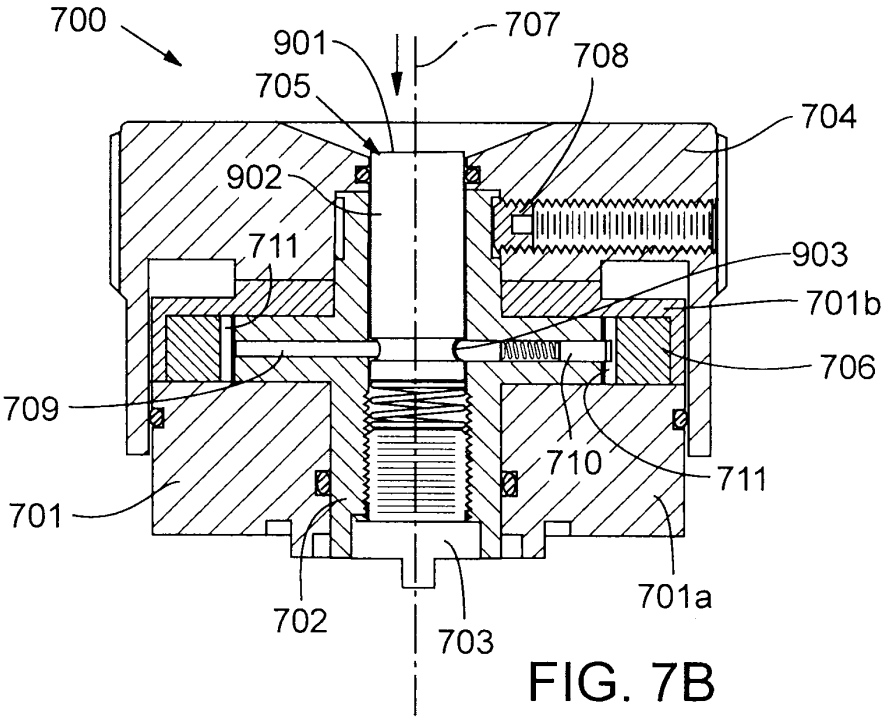
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FIG. 7B

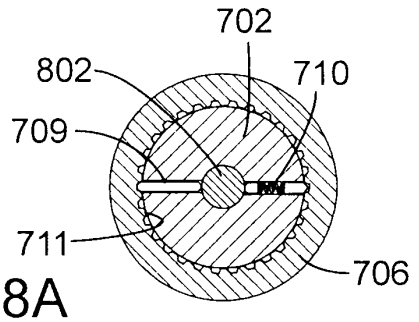
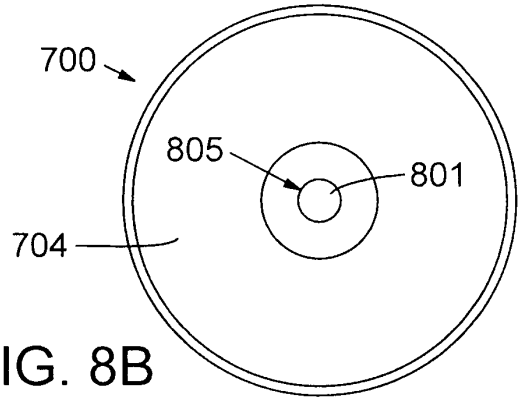


FIG. 8A



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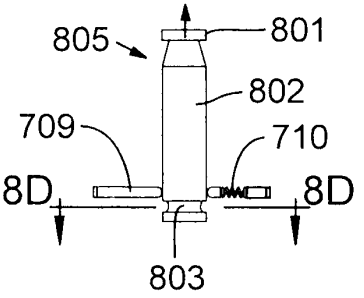

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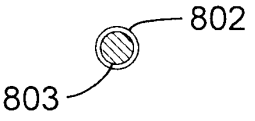

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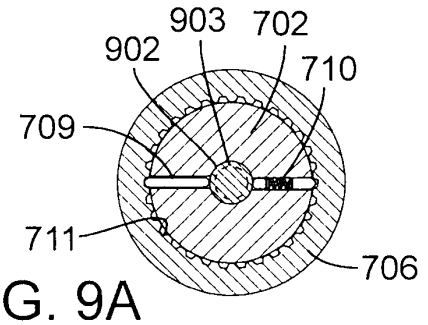


FIG. 9A

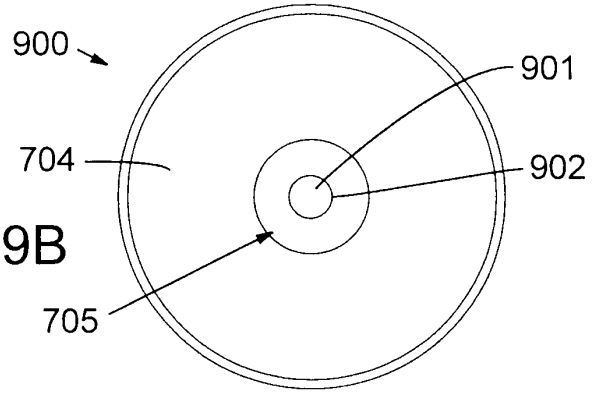
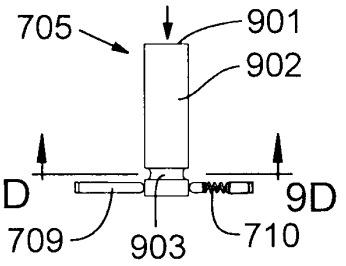


FIG.9B



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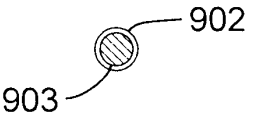

FIG. 9D

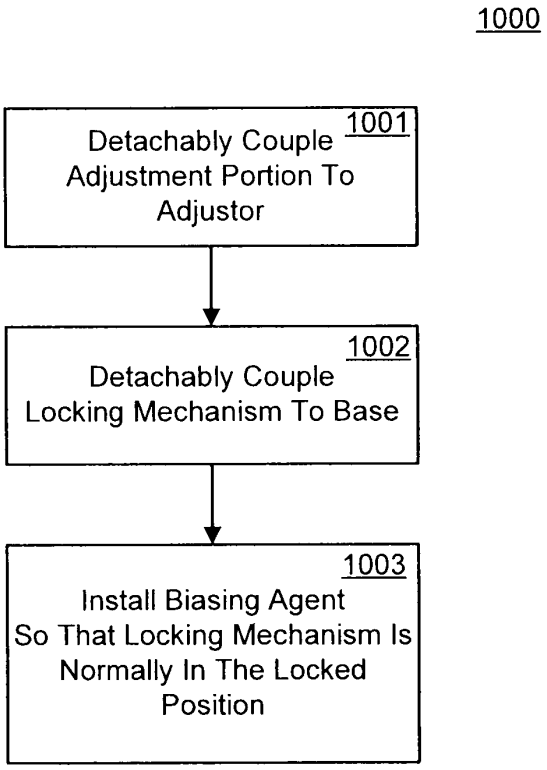
1000
1001
Detachably Couple Adjustment Portion To Adjustor
1002
Detachably Couple Locking Mechanism To Base
1003
Install Biasing Agent So That Locking Mechanism Is Normally In The Locked Position

FIG. 10

LOCKING ADJUSTMENT KNOB FOR A SIGHTING DEVICE

RELATED APPLICATIONS

This application is a continuation of and claims priority to U.S. application Ser. No. 11/720,428, filed May 29, 2007, now U.S. Pat. No. 8,006,429, which is a national phase entry of International Application No. PCT/US2005/043336, filed Nov. 30, 2005, which claims the benefit of U.S. Provisional Application No. 60/632,331, filed Nov. 30, 2004, and U.S. Provisional Application No. 60/638,561, filed Dec. 22, 2004. The entire teachings of each of the above applications are incorporated by reference herein.

BACKGROUND

The present disclosure relates to an optical enhancing device, such as a telescopic observation sighting device or individual shoulder (or hand-fired) firearms sighting device (telescopic sight herein). Embodiments described herein may also be used with any optical enhancing device containing adjusters, such as a microscope, telescope, etc. For purposes of illustration, it will be assumed herein that the optical enhancing device is a telescopic sight.

A telescopic sight, typically used to aim a firearm, is usually mounted on the firearm. An adjustment knob on a telescopic sight is typically used for changing a setting of an adjuster that may change the adjustment of, for example, elevation, crossrange (also "windage" herein), or parallax of the telescopic sight. Parameters such as elevation, crossrange, and parallax, may be painstakingly set in order that the firearm hit a specific target. Once set for a particular target, the setting preferably remains unchanged until after a shot is fired.

Existing telescopic sighting systems for civilian, law enforcement, and military firearms typically utilize one or more of three types of adjustment knobs. The first type of adjustment knob, termed a "hunting style" knob, utilizes a cover cap that must be removed prior to adjustment of the sight and replaced after adjustment of the sight to protect the adjustment member of the knob from unintentional adjustment. An advantage of this style of adjustment knob is that it is protected from moisture due to the protection provided by the cover cap. A disadvantage of this type of adjustment knob is that for each adjustment, the cap must be removed and replaced, thereby creating a potential for cap loss.

The second type of adjustment knob is termed a "target style" knob, and is accessible for adjustment at all times. An advantage of this type of adjustment knob is that it is accessible for adjustment at all times without the necessity of removing and replacing a cover cap. A disadvantage is that the adjustment knob can be inadvertently rotated by accidental physical contact.

The third type of adjustment knob is a variation of the "target style" adjustment knob and is a replacement knob used in lieu of the "hunting style" turret knob protective cap. This style of adjustment knob provides a "target style" function, should a marksman choose its use. The advantages and disadvantages of this type of adjustment knob are the same as for the "target style" knob.

What is needed is an adjustment knob that is mechanically lockable, and can be unlocked by an operator when a change in setting is desired.

SUMMARY OF THE DISCLOSURE

According to one embodiment, an adjustment knob is mechanically lockable and can be unlocked by an operator when a change in setting is desired. In particular, a locking turret knob may include an adjustment member, a first member, and a second member. The adjustment member is adjustably positionable about an axis of rotation. The first member is disposed in proximity to the adjustment member and has at least one engagement member. The second member is disposed in proximity to the adjustment member and has at least one engagement surface. The adjustment member is adjustably positionable about the axis of rotation when each engagement member does not engage an engagement surface, and the adjustment member is locked in a selected position about the axis of rotation when at least one engagement member engages an engagement surface. The adjustment member can be coupled to an adjuster of an optical enhancement device, such as a telescopic sight, a telescope or a microscope. A change in the selected position of the adjustment member produces a change in an adjustment setting of the adjuster of the optical enhancement device.

In one embodiment, the first member is fixably coupled to the adjustment member. In another embodiment, the second member is fixably coupled to the adjustment member.

The at least one engagement surface may be an aperture and the at least one engagement member may be a protuberance, such as a pin member, that engages the aperture. In another embodiment, the at least one engagement surface is part of a spline structure. For example, the at least one engagement member can be part of a spline structure that engages the engagement surface of another spline structure. As another example, at least one engagement member can be a protuberance that engages the engagement surface of another spline structure.

According to one embodiment, the adjustment member becomes unlocked in response to application of a force and is adjustably positionable to a newly selected position about the axis of rotation. Accordingly, the adjustment member becomes locked in the newly selected position about the axis of rotation in response to removal of the force.

A locking selection member may be coupled to the first member. The locking selection member is responsive to a force, such as a pulling force or a pushing force, applied to the locking selection member by causing each engagement member of the first member to disengage each engagement surface of the second member. When the force is removed or another force is applied, the locking selection member enables each engagement member of the first member to engage a corresponding engagement surface of the second member. One alternative embodiment provides that the force rotates the locking selection member when the force is applied in a first rotational direction. Accordingly, when the force is removed and when a second force that is applied to the locking selection member in a second rotational direction, the locking selection member enables at least one engagement member of the first member to engage a corresponding engagement surface of the second member.

A method of manufacturing a locking turret knob may include providing an adjustment member adjustably positionable about an axis of rotation, providing a first member disposed in proximity to the adjustment member and having at least one engagement member; and providing a second member disposed in proximity to the adjustment member and having at least one engagement surface, such that the adjustment member is adjustably positionable about the axis of rotation when each engagement member does not engage an engagement surface, and the adjustment member being locked in a selected position about the axis of rotation when at least one engagement member engages an engagement surface.

BRIEF DESCRIPTION OF THE DRAWINGS

Various embodiments are illustrated by way of example and not by limitation in the accompanying figures in which like reference numerals indicate similar elements and in which:

FIG. **1** shows a side cross-sectional view of one example of a locking pin turret knob assembly in an engaged, or locked, configuration;

FIG. **2** shows a side cross-sectional view of the locking pin turret knob assembly shown in FIG. **1** in a disengaged, or unlocked, configuration;

FIG. **3** shows a side cross-sectional view of one example of a locking spline turret knob assembly in an engaged, or locked, configuration;

FIG. **4** shows a side cross-sectional view of the locking spline turret knob assembly shown in FIG. **3** in a disengaged, or unlocked, configuration;

FIG. **5**A shows a side cross-sectional view of one example of a cam-actuated locking turret knob assembly in an engaged, or locked, configuration;

FIG. **5**B shows a side cross-sectional view the cam-actuated locking turret knob assembly of FIG. **5**A in an unengaged, or unlocked, configuration;

FIG. **6**A shows a cross-sectional view of the turret knob shown in FIG. **5**A taken along line **6**A-**6**A in FIG. **5**A;

FIG. **6**B shows a top view of the turret knob of FIG. **5**A showing detail of a locking selector thereof;

FIG. **6**C shows a side view of the locking selector shown in FIG. **6**B with other components of the locking turret knob omitted for clarity;

FIG. **6**D shows a cross-sectional view of the locking selector shown in FIG. **6**C taken along line **6**D-**6**D in FIG. **6**C;

FIG. **7**A shows a side cross-sectional view of one example of a locking turret knob assembly in an engaged, or locked, configuration;

FIG. **7**B shows a side cross-sectional view of the locking turret knob assembly of FIG. **7**A in an unengaged, or unlocked, configuration;

FIG. **8**A shows a cross-sectional view of one example of a push/pull locking selector that can be used with the locking turret knob shown in FIG. **7**A with respect to one example of a locking ratchet ring;

FIG. **8**B shows a top view of the push/pull locking selector of FIG. **8**A and one example of a locking turret knob assembly;

FIG. **8**C shows a side view of the push/pull locking selector shown in FIG. **8**A with certain other components of the locking turret knob omitted for clarity;

FIG. **8**D shows a cross-sectional view of the push/pull locking selector shown in FIG. **8**C taken along line **8**D-**8**D in FIG. **8**C;

FIG. **9**A shows a cross-sectional view of the locking turret knob of in FIG. **7**A taken at line **9**A-**9**A in FIG. **7**A, showing detail of a push unlock selector;

FIG. **9**B shows a top view of the push unlocking selector shown in FIG. **9**A and one example of a locking turret knob assembly;

FIG. **9**C shows a side view of the push unlocking selector shown in FIG. **9**A with certain other components of the locking turret knob omitted for clarity;

FIG. **9**D shows a cross-sectional view of the push unlocking selector shown in FIG. **9**C taken along line **9**D-**9**D in FIG. **9**C; and

FIG. **10** shows a flow diagram for making a locking turret knob according to one embodiment.

DETAILED DESCRIPTION

According to one embodiment, an adjustment knob is provided for an optical setting, such as elevation, windage, parallax, or illuminated reticle power control of an optical-based instrument, such as a telescopic sighting system, a telescope or a microscope, that is mechanically lockable and weather proof, thereby eliminating inadvertent adjustment of an optical setting by accidental physical contact. Accordingly, the user may mechanically unlock the adjustment knob to make a desired adjustment of an optical or power setting. Thus, optical or power settings made by a user are reliably maintained regardless of the environmental conditions or whether the adjustment knob is accidentally touched.

FIG. **1** shows a side cross-sectional view of one example of a locking pin turret knob assembly **100** in an engaged, or locked, configuration. FIG. **2** shows a side cross-sectional view of the locking pin turret knob assembly **100** in a disengaged, or unlocked, configuration.

Locking pin turret knob assembly **100** includes a turret plate base **101**, an adjustment nut assembly **102** having a lower section **102***a* and an upper section **102***b*, a spade screw **103**, a spur ring **104**, a locking ring **105**, a plurality of locking ring splines **106**, an index ring **107**, a plurality of locking pins **108**, a spring member **110** and a turret assembly nut **109**. Turret base plate **101** is fixedly attached to, for example, a telescopic sight or other optical enhancing device (not shown). The lower section of adjustment nut assembly **102***a* fits inside an aperture (not indicated for clarity) that is formed in and passes through turret base plate **101**. In particular, adjustment nut assembly lower section **102***a* and upper section **102***b* are held together by screws **111** in a manner that allows adjustment nut assembly **102** to be fixedly engaged with turret base plate **101** and freely rotate in the aperture formed in turret base plate **101** about an axis **112**. Adjustment nut assembly **102** threadably engages the upper section of spade screw **103**. The lower rectangular section of spade screw **103** passes through a slot in the body of the telescopic sight and mechanically engages an optical adjustor (not shown) of the telescopic sight.

Spur ring **104** fixedly fits around adjustment nut assembly upper section **102***b*. Locking ring **105**, which includes a plurality of locking ring splines **106**, fixedly fits around turret base plate **101**. Locking ring splines **106** define one or more spline valleys defining engagement surfaces. Index ring **107** fits onto spur ring **104** and around locking ring **105**. A plurality of locking pins **108** are fixedly attached to index ring, engage apertures in spur ring **104** and engage locking ring splines **106** when index ring is fitted onto spur ring **104** and around locking ring **105**. Turret assembly nut **109** threadably engages adjustment nut assembly upper section **102***b* and forms a cavity **113** into which spring member **110** fits. That is, spring member **110** fits into cavity **113** between a top surface **114** of index ring **107** and an inner surface **115** of turret assembly nut **109**.

When locking pin turret knob assembly **100** is in a locked configuration, locking pins **108** engage locking ring splines **106** of fixed locking ring **105** so that index ring **107**, spur ring **104**, assembly nut **109**, and adjustment nut assembly **102** cannot be rotated around axis **112** and, consequently, spade screw **103** cannot adjust the corresponding optical adjustment of the telescopic sight.

FIG. **2** shows a side cross-sectional view of locking pin turret knob assembly **100** in a disengaged, or unlocked, con-

figuration. By applying a force that moves index ring **107** along axis **112** in a direction **116** away from telescopic sight (i.e., pulling index ring **107** away from the telescopic sight), spring member **110** compresses within cavity **113** and locking pins **108** disengage locking ring splines **106**. While in the unlocked configuration, fixed locking pins **108** of index ring **107** remain in engagement with the apertures of spur ring **104**, and spur ring **104**, which, in turn, is fixedly engaged with adjustment nut assembly **102**. Index ring **107** can be rotated around axis **112**, thereby also rotating spur ring **104**, assembly nut **109**, and adjustment nut assembly **102** around spade screw **103** which is fixed from rotation by the lower rectangular portion of the spade screw **103** passing through a slot in the telescopic sight body. Rotation of adjustment nut assembly **102** around spade screw **103** results in a linear movement of spade screw **103** and optical adjustment of the telescopic sight.

While FIGS. **1** and **2** show and have been described by making reference to a plurality of locking pins, it should be understood that only a single locking pin is needed. Additionally, while locking splines **106** have been described, it should be understood that a mechanical member having a plurality of apertures that engage locking pins **108** can alternatively be used. According to another embodiment, locking pins, which are fixedly attached to a structure corresponding to locking ring **105**, could lockably and unlockably engage locking spline structures that are part of the index ring.

A marksman may calibrate the locking turret knob illustrated in FIGS. **1** and **2**, i.e., reorient the orientation of index ring **107** relative to adjustment nut assembly lower section **102***a*, as follows: At a predetermined distance, the marksman adjusts an adjuster setting, e.g., elevation, windage or parallax, by unlocking locking pin turret knob **100**, rotating locking turret knob index ring **107**, and releasing index ring **107** to relock the adjuster. Turret assembly nut **109**, detachably coupled (e.g., via screw threads between turret assembly nut **109** and adjustment nut assembly upper section **102***b*) to adjustment nut assembly upper section **102***b*, is then uncoupled from adjustment nut assembly upper section **102***b*. Index ring **107** may then be pulled by the marksman away from the body of locking pin turret knob **100** so that locking pins **108** disengage from lock ring **105**, thereby allowing the marksman to selectively orient index ring **107** without causing any adjustment of spade screw **103**. Index ring **107** can then be zeroed (by rotating around its axis of rotation) so that, for example, a zero-point mark (not shown) on index ring **107** is aligned with an index mark (not shown) on turret base plate **101**. Turret assembly nut **109** is then re-coupled and tightened to adjustment nut assembly upper section **102***b*, which re-engages spring member **110**. Index ring **107** is then biased toward adjustment nut assembly upper section **102***b*, engaging locking pins **108** with the locking ring splines **106** of lock ring **105**, thereby re-establishing the locked configuration.

FIG. **3** shows a side cross-sectional view of one example of a locking spline turret knob assembly **300** in an engaged, or locked, configuration. FIG. **4** shows a side cross-sectional view of the locking spline turret knob assembly **300** in a disengaged, or unlocked, configuration.

Locking spline turret knob assembly **300** includes a turret base plate **301**, an adjustment nut assembly **302** having a lower section **302***a* and an upper section **302***b*, a spade screw **303**, an index ring **304**, and a turret assembly nut **305**. Turret base plate **301** is fixedly attached to, for example, a telescopic sight or other optical enhancing device (not shown). The lower section of adjustment nut assembly **302***a* fits inside an aperture (not indicated for clarity) that is formed in and passes through turret base plate **301**. In particular, adjustment nut assembly lower section **302***a* and upper section **302***b* are held together by screws **306** in a manner that allows adjustment nut assembly **302** to be fixedly engaged with turret base plate **301** and freely rotate in the aperture formed in turret base plate **301** about an axis **307**. Adjustment nut assembly **302** threadably engages the upper section of spade screw **303**. The lower rectangular section of spade screw **303** passes through a slot in the body the telescopic sight and mechanically engages an optical adjustor (not shown) of the telescopic sight.

Index ring **304** fits around adjustment nut assembly upper section **302***b* and includes a plurality of mating splines **308** and a plurality of locking splines **310**. Index ring mating splines **310** engage adjustment nut mating splines **308** of adjustment nut assembly upper section **302***b* as index ring **304** fits around adjustment nut assembly upper section **302***b*. Index ring locking splines lockably engage turret base plate locking splines **311** when locking turret knob assembly **300** is in the locked configuration. Turret assembly nut **305** threadably engages adjustment nut assembly upper section **302***b* and forms a cavity **312** into which a spring member **313** fits. That is, spring member **313** fits into cavity **312** between a top surface **314** of index ring **304** and an inner surface **315** of turret assembly nut **305**.

When locking pin turret knob assembly **300** is in a locked configuration, index ring locking splines **309** engage turret base plate locking splines **311** so that adjustment nut assembly **302**, index ring **304**, and turret assembly nut **305** cannot be rotated around axis **307** and, consequently, spade screw **303** cannot adjust the corresponding optical adjustment of the telescopic sight.

FIG. **4** shows a side cross-sectional view of locking pin turret knob assembly **300** in a disengaged, or unlocked, configuration. By applying a force that moves index ring **304** along axis **307** in a direction **316** away from telescopic sight (i.e., pulling index ring **304** away from the telescopic sight), spring member **313** compresses within cavity **312** and index ring locking splines **309** disengage turret base plate locking splines **311**. While in the unlocked configuration, index ring mating splines **308** continue to engage adjustment nut assembly mating splines **310** of adjustment nut assembly upper section **302***b* and thereby engage adjustment nut assembly **302**. Index ring **304** can be rotated around axis **307**, thereby also rotating, turret assembly nut **305**, and adjustment nut assembly **302** around spade screw **303** which is fixed from rotation by the lower rectangular portion of the spade screw **303** passing through a slot in the telescopic sight body. Rotation of adjustment nut assembly **302** around spade screw **303** results in a linear movement of spade screw **303** and optical adjustment of the telescopic sight.

When adjustment is completed, the marksman releases index ring **304**, and spring member **313** biases index ring **304** toward turret base plate **301**, thereby returning locking turret knob assembly **300** to the locked configuration.

A marksman may calibrate locking turret knob assembly **300** depicted in FIGS. **3** and **4**, as follows. For a predetermined target distance, the marksman adjusts an adjuster setting, e.g., elevation, windage or parallax, by unlocking locking turret knob assembly **300**, rotating index ring **304** for the desired calibration and then releasing the index ring **304** to relock locking turret knob assembly **300**. Turret assembly nut **305**, which is threadably coupled to adjustment nut assembly upper section **302***b*, is unthreaded from adjustment nut assembly upper section **302***b*, which releases spring member **313**, thereby allowing index ring mating splines **308** to become disengaged from adjustment nut assembly mating splines **310**. Index ring **304** can then be pulled by the marksman in the direction indicated by arrow **316**, thus uncoupling

index ring mating splines **308** from adjustment nut assembly mating splines **310**. The marksman can then rotate index ring **304** to a desired calibration setting without causing any adjustment of spade screw **303**. That is, index ring **304** can then be zeroed by rotating index ring so that a zero-point mark (not shown) on index ring **304** is aligned with an index mark (not shown) on turret base plate **301**. Turret assembly nut **305** is then rethreaded and tightened onto adjustment nut assembly upper section **302***b*, thereby enabling spring member **313** to bias index ring **304** toward adjustment nut assembly upper section **302***b*. Index ring mating splines **308** re-engage with adjustment nut assembly mating splines **310** and index ring locking splines **309** re-engage with turret base plate locking splines **311**, thereby re-establishing a locked configuration of locking turret knob assembly **300**, such as shown in FIG. **3**.

FIG. **5**A shows a side cross-sectional view of one example of a cam-actuated locking turret knob assembly **500** in an engaged, or locked, configuration. FIG. **5**B shows a side cross-sectional view the cam-actuated locking turret knob assembly of FIG. **5**A in an unengaged, or unlocked, configuration. FIGS. **6**A-**6**D show different views of a locking selector **505** that can be used with the cam-actuated locking turret knob assembly **500**.

Cam-actuated locking turret knob assembly **500** includes a turret base plate **501** formed by a lower section **501***a* and an upper section **501***b*, an adjustment nut assembly **502**, a spade screw **503**, an index ring **504**, a locking selector **505** and a locking ratchet ring **506**. Turret base plate **501** is fixedly attached to, for example, a telescopic sight or other optical enhancing device (not shown). Adjustment nut assembly **502** fits inside an aperture (not indicated for clarity) that is formed in and passes through turret base plate **501**. Adjustment nut assembly **502** is fixedly engaged with turret base plate **501** and is free to rotate in the aperture formed in turret base plate **501** about an axis **507**. Adjustment nut assembly **502** threadably engages the upper section of spade screw **503**. The lower rectangular section of spade screw **503** passes through a slot in the body of the telescopic sight and mechanically engages an optical adjustor (not shown) of the telescopic sight. Locking ratchet ring **506** is fixedly attached to turret base plate **501**.

Index ring **504** fits around turret base plate **501** and is fixedly held to adjustment nut assembly **502** by a set screw **508**. Locking selector **505** fits into an aperture formed in index ring **504** and engages locking ratchet ring **506** with a cam-actuated locking wedge pin **509**. When cam-actuated locking wedge pin **509** is engaged with locking ratchet ring **506**, locking turret knob assembly **500** is in locked position, as shown in FIG. **5**A, thereby rendering index ring **504** unable to be rotated about axis of rotation **507**. A spring-loaded ratchet pin **510** can also be optionally used so that when locking turret knob assembly **500** is unlocked (i.e., cam-actuated locking wedge pin **509** is disengaged from locking ratchet **506**), an adjustment made by rotating locking turret knob assembly **500** will have a tactile feel. In the unlocked configuration, cam-actuated locking wedge pin **509** is disengaged from locking ratchet ring **506**, and index ring **504** and adjustment nut assembly **502** can be rotated around axis **507**, thereby rotating around spade screw **503** which is fixed from rotation by the lower rectangular portion of the spade screw **503** passing through a slot in the telescopic sight body. Rotation of adjustment assembly nut **502** around spade screw **503** results in a linear movement of spade screw **103** and optical adjustment of the telescopic sight.

FIGS. **6**A-**6**D show different views of locking selector **505** that can be used with the cam-actuated locking turret knob assembly **500**. In particular, FIG. **6**A shows a cross-sectional view of locking selector **505** with respect to locking ratchet ring **506**. FIG. **6**B shows a top view of locking selector **505** and locking turret knob assembly **500**. FIG. **6**C shows a side view of locking selector **505**. FIG. **6**D shows a cross-sectional view of locking selector **505** taken along line **6**D-**6**D in FIG. **6**C.

Locking selector **505** includes a selector knob **601**, a selector shaft **602** and a cam surface **603**. When a telescopic sight adjustment is desired, selector knob **601** is grasped and rotated around axis **507** (FIG. **5**A) from a locked position to an unlocked position. In the unlocked position, cam surface **603** of a selector shaft **602** disengages cam-actuated locking wedge pin **509** from locking ratchet ring **506** and allows index ring **504** to be rotated about axis of rotation **507** (FIG. **5**A).

Upon completion of an adjustment, locking selector **505** is then rotated by the marksman to the locked position. In the locked position, cam surface **603** of locking selector shaft **602** pushes outwardly on cam-actuated locking wedge pin **509** to engage cam-activated locking wedge pin **509** with grooves **511** (FIGS. **5**A and **6**A) of locking ratchet ring **506**. Locking ratchet ring **506** is fixedly coupled to turret base plate **501**, thereby preventing inadvertent adjustment of index ring **504** and spade screw **503**.

FIG. **7**A shows a side cross-sectional view of one example of a locking turret knob assembly **700** in an engaged, or locked, configuration. FIG. **7**B shows a side cross-sectional view of the locking turret knob assembly of FIG. **7**A in an unengaged, or unlocked, configuration. FIGS. **9**A-**9**D show different views of a push-unlocking selector **705** that can be used with the locking turret knob assembly **700**, shown in FIG. **7**A.

Locking turret knob assembly **700** includes a turret base plate **701** formed by a lower section **701***a* and an upper section **701***b*, an adjustment nut assembly **702**, a spade screw **703**, an index ring **704**, a push-unlocking selector **705** and a locking ratchet ring **706**. Turret base plate **701** is fixedly attached to, for example, a telescopic sight or other optical enhancing device (not shown). Adjustment nut assembly **702** fits inside an aperture (not indicated for clarity) that is formed in and passes through turret base plate **701**. Adjustment nut assembly **702** is fixedly engaged with turret base plate **701** and is free to rotate in the aperture formed in turret base plate **701** about an axis **707**. Adjustment nut assembly **702** threadably engages the upper section of spade screw **703**. The lower rectangular section of spade screw **703** passes through a slot in the body of the telescopic sight and mechanically engages an optical adjustor (not shown) of the telescopic sight. Locking ratchet ring **706** is fixedly attached to turret base plate **701**.

Index ring **704** fits around turret base plate **701** and is fixedly held to adjustment nut assembly **702** by a set screw **708**. Index ring **704** also engages locking ratchet ring **706**. Push-unlocking selector **705** fits into an aperture formed in index ring **704** and engages locking ratchet ring **706** with a plunger-actuated locking wedge pin **709**. When push/pull locking wedge pin **709** is engaged with locking ratchet ring **706**, locking turret knob assembly **700** is in locked position, as shown in FIG. **7**A, thereby rendering index ring **704** unable to be rotated about axis of rotation **707**. A spring-loaded wedge pin **710** can also be optionally used so that when locking turret knob assembly **700** is unlocked (i.e., plunger-actuated locking wedge pin **709** is disengaged from locking ratchet **706**), an adjustment made by rotating locking turret knob assembly **700** will have a tactile feel. In the unlocked configuration, plunger-actuated locking wedge pin **709** is disengaged from locking ratchet ring **706**, and index ring **704** and adjustment assembly **702** can be rotated around axis **707** and spade screw **703** which is fixed from rotation by the lower rectangular portion of the spade screw **703** passing through a

slot in the telescopic sight body. Rotation of adjustment nut assembly **702** around spade screw **703** results in a linear movement of spade screw **703** and optical adjustment of the telescopic sight.

FIGS. **8**A-**8**D show different views of the push/pull locking selector **805** that can be used with the locking turret knob assembly **700**, shown in FIG. **7**A, as an alternative to push un-locking selector **905**. In particular, FIG. **8**A shows a cross-sectional view of push/pull locking selector **805** with respect to locking ratchet ring **706**. FIG. **8**B shows a top view of push/pull locking selector **805** and locking turret knob assembly **700**. FIG. **8**C shows a side view of push/pull locking selector **805**. FIG. **8**D shows a cross-sectional view of push/pull locking selector **805** taken along line **8**D-**8**D in FIG. **8**C.

Push/pull locking selector **805** includes a selector knob **801**, a selector shaft **802** and a circumferential groove **803**. When a telescopic sight adjustment is desired, selector knob **801** is grasped and pulled in an outwardly direction along axis **707** (FIG. **7**A) from a locked position to an unlocked position. In the unlocked position, circumferential groove **803** of a selector shaft **802** allows plunger-actuated locking wedge pin **709** to drop into circumferential groove **803**, thereby disengaging locking wedge pin **709** from locking ratchet **15** ring **706** and allowing index ring **704** to be rotated about axis of rotation **707** (FIG. **7**A).

Upon completion of an adjustment, push/pull locking selector **805** is then pushed in an inwardly direction along axis **707** (FIG. **7**A) from the unlocked position to the locked position. In the locked position, circumferential groove **803** of locking selector shaft **802** moves below locking wedge pin **809** and selector shaft **802** pushes outwardly on plunger-actuated locking wedge pin **709** to engage plunger-activated locking wedge pin **709** with grooves **711** (FIG. **7**A and **8**A) of locking ratchet ring **706**. Locking ratchet ring **706** is fixedly coupled to turret base plate **701**, thereby preventing inadvertent adjustment of index ring **704** and spade screw **703**.

FIGS. **9**A-**9**D show different views of the push unlocking selector **705** that can be used with a locking turret knob assembly, such as locking turret knob assembly **700** shown in FIG. **7**A. In particular, FIG. **9**A shows a cross-sectional view of push unlocking selector **705** with respect to a locking ratchet ring **706**. FIG. **9**B shows a top view of push unlocking selector **705** and the locking turret knob assembly **700**. FIG. **9**C shows a side view of push unlocking selector **705**. FIG. **9**D shows a cross-sectional view of push unlocking selector **705** taken along line **9**D-**9**D in FIG. **9**C.

Push unlocking selector **705** includes a push selector knob **901**, a selector shaft **902** and a circumferential groove **903**. When a telescopic sight adjustment is desired, selector knob **901** is pushed inwardly from a locked position to an unlocked position. In the unlocked position, circumferential groove **903** of a selector shaft **902** moves inward and allows plunger-actuated locking wedge pin **709** to disengage from locking ratchet ring **706** and allows an index ring (not shown) to be rotated about an axis of rotation (not shown).

Upon completion of an adjustment, selector knob **901** is then released from the unlocked position to the locked position. In the locked position selector shaft **902** moves outward thereby moving circumferential groove **903** of selector shaft **902** to move above wedge pin **709**. The lower section of selector shaft **902** pushes outwardly on locking wedge pin **709** to engage plunger-activated locking wedge pin **709** with grooves **711** (FIGS. **7**A and **9**A) of locking ratchet ring **706**. Locking ratchet ring **706** is fixedly coupled to a turret base plate (not shown), thereby preventing inadvertent adjustment of the index ring and a spade screw.

FIG. **10** shows a flow diagram **1000** for making a locking turret knob according to one embodiment. An adjustment member is detachably coupled at **1001** to an adjuster, such that the axis of rotation of the adjustment member coincides with the axis of rotation of the adjuster. At **1002**, an adjustment member locking mechanism is then coupled to the base for preventing unintended rotation of the adjustment member. With the locking turret knob in the normally locked state, a marksman can unlock the index ring in order to perform an adjustment. When the adjustment member is unlocked, rotating the adjustment member produces an adjustment of the adjuster. At **1003**, a spring member, such as a spring, may be provided for producing a biasing force on the adjustment member, thereby rendering the adjustment member normally coupled to the base, i.e., locked. Operator-supplied force counteracting the biasing force uncouples the adjustment member from the base, enabling the operator to effect an adjustment of the adjuster via, e.g., rotating the index ring.

It should be understood that the locking turret knob assemblies described herein can be used as adjustment knobs for a telescopic sight or any other optical-based instrument having adjustment knobs, for example an optical enhancing device such as a lens or microscope, telescope, etc.

Although the foregoing description includes some detail for purposes of clarity of understanding, it will be apparent that certain changes and modifications may be made to the details of the above-described embodiments that are within the scope of the appended claims. Accordingly, the present embodiments are to be considered as illustrative and not restrictive, and the invention is not to be limited to the details given herein, but may be modified within the scope and equivalents of the appended claims.

The invention claimed is:

1. A firearm sighting device comprising:

an adjustment mechanism supported by the sighting device, the adjustment mechanism configured to adjust a setting of the sighting device; and

an adjustment knob supported by the sighting device, the adjustment knob comprising:

an actuator in operative association with the adjustment mechanism, the actuator including an axis of rotation and an outer surface that is grippable by a user, wherein rotation of the actuator drives the adjustment mechanism to thereby adjust the setting of the sighting device; and

a locking mechanism in operative association with the actuator, the locking mechanism including a first portion non-rotatably coupled to the sighting device and a second portion coupled to the actuator such that the second portion rotates about the axis of rotation along with the actuator, the second portion selectively movable between locked and unlocked positions such that when the second portion is in the locked position the first and second portions are engaged so as to restrain the actuator from rotation about the axis of rotation and when the second portion is in the unlocked position the first and second portions are disengaged so that the actuator is rotatable about the axis of rotation for adjusting the setting of the sighting device.

2. A device according to claim **1**, wherein the sighting device comprises a telescopic sighting device and the setting comprises an optical setting.

3. A device according to claim **2**, wherein:

the adjustment knob further comprises a rotatable member coupled to the actuator such that the rotatable member rotates about the axis of rotation along with the actuator, the rotatable member including a threaded portion cen-

tered on the axis of rotation and restrained from traveling linearly along the axis of rotation; and

the adjustment mechanism comprises a threaded adjustment member threaded to the rotatable member and restrained from rotating about the axis of rotation so that rotation of the rotatable member about the axis of rotation is translated into linear motion of the threaded adjustment member along the axis of rotation, thereby adjusting the optical setting of the telescopic sighting device.

4. A device according to claim **2**, wherein the first and second portions of the locking mechanism include teeth that are engageable with one another such that the actuator is restrained from rotation about the axis of rotation when the teeth of the first portion engage the teeth of the second portion.

5. A device according to claim **2**, wherein the first portion of the locking mechanism includes a plurality of splines that fit inside corresponding grooves of the second portion of the locking mechanism, the second portion of the locking mechanism includes a plurality of splines that fit inside corresponding grooves of the first portion of the locking mechanism, when the second portion of the locking mechanism is in the locked position the splines of the first and second portions are engaged, and when the second portion of the locking mechanism is in the unlocked position the splines of the first and second portions are not engaged.

6. A device according to claim **2**, wherein one of the first and second portions of the locking mechanism comprise a plurality of apertures, the other one of the first and second portions of the locking mechanism comprise one or more pin members that fit into the plurality of apertures, when the second portion of the locking mechanism is in the locked position the one or more pin members are inserted into one or more of the apertures, and when the second portion of the locking mechanism is in the unlocked position the one or more pin members are not inserted into any of the apertures.

7. A device according to claim **2**, further comprising:

a biasing element arranged to bias the second portion of the locking mechanism to the locked position.

8. A device according to claim **2**, wherein at least a portion of the actuator is configured to be moveable linearly along the axis of rotation between a first axial position at which the second portion of the locking mechanism is in the locked position and a second axial position at which the second portion of the locking mechanism is in the unlocked position.

9. A device according to claim **8**, wherein the actuator is configured such that the actuator moves further away from the telescopic sighting device when the actuator transitions from the first axial position to the second axial position, whereby the optical setting of the telescopic sighting device is adjustable by moving the actuator along the axis of rotation away from the telescopic sighting device and rotating the actuator about the axis of rotation.

10. A device according to claim **2**, wherein the adjustment knob further comprises:

a lock actuator in operative association with the locking mechanism, wherein the lock actuator includes a cam surface aligned with the second portion of the locking mechanism and the lock actuator is rotatable about the axis of rotation between (1) a first rotational position at which the cam surface urges the second portion of the locking mechanism to the locked position and (2) a second rotational position at which the second portion of the locking mechanism is free to move into a recess of the cam surface and thereby into the unlocked position.

11. A device according to claim **2**, wherein the adjustment knob further comprises:

a lock actuator in operative association with the locking mechanism, wherein the lock actuator includes a circumferential groove disposed in proximity with the second portion of the locking mechanism and the lock actuator is configured to travel linearly along the axis of rotation between (1) a first axial position at which the circumferential groove is aligned with the second portion of the locking mechanism such that the second portion of the locking mechanism is free to move into the circumferential groove and thereby into the unlocked position and (2) a second axial position at which the circumferential groove is not aligned with the second portion of the locking mechanism and the lock actuator urges the second portion of the locking mechanism to the locked position.

12. A device according to claim **11**, wherein the lock actuator is configured such that the lock actuator moves closer to the telescopic sighting device when the lock actuator transitions from the second axial position to the first axial position, whereby the optical setting of the telescopic sighting device is adjustable by moving the lock actuator linearly along the axis of rotation toward the telescopic sighting device and rotating the actuator about the axis of rotation.

13. A device according to claim **11**, wherein the lock actuator is configured such that the lock actuator moves further away from the telescopic sighting device when the lock actuator transitions from the second axial position to the first axial position, whereby the optical setting of the telescopic sighting device is adjustable by moving the lock actuator linearly along the axis of rotation away from the telescopic sighting device and rotating the actuator about the axis of rotation.

14. A device according to claim **2**, wherein the optical setting of the telescopic sighting device comprises one or more of elevation, windage, parallax, and an illuminated reticle power control.

15. An adjustment knob apparatus for driving an adjustment mechanism of a sighting device, wherein the adjustment mechanism is configured to adjust a setting of the sighting device, the apparatus comprising:

a locking member configured to be non-rotatably coupled to the sighting device, wherein the locking member includes a surface having spaced apart engagement features disposed thereon;

a rotatable member disposed in proximity to the locking member, wherein the rotatable member includes an axis of rotation and is configured to be in operative association with the adjustment mechanism of the sighting device such that rotation of the rotatable member about the axis of rotation drives the adjustment mechanism to adjust the setting of the sighting device;

a pin member coupled to the rotatable member such that the pin member rotates about the axis of rotation along with the rotatable member, wherein at least a portion of the pin member is configured to fit the spaced apart engagement features disposed on the locking member and the pin member is moveable between (1) a locked position in which at least a portion of the pin member engages one or more of the spaced apart engagement features such that the rotatable member is restrained from rotation about the axis of rotation and (2) an unlocked position in which the pin member disengages the spaced apart engagement features so that the rotatable member is rotatable about the axis of rotation relative to the locking member for adjusting the setting of the sighting device; and

an actuator in operative association with the pin member, wherein the actuator is configured to cause the pin member to move to the unlocked position in response to an external force applied to the actuator.

16. An apparatus according to claim **15**, wherein the sighting device comprises a telescopic sighting device and the setting comprises an optical setting.

17. An apparatus according to claim **16**, wherein the rotatable member includes a threaded portion centered on the axis of rotation, the rotatable member is restrained from traveling linearly along the axis of rotation, and the adjustment mechanism of the telescopic sighting device comprises a threaded adjustment member configured to be threaded to the rotatable member and restrained from rotating about the axis of rotation so that rotation of the rotatable member about the axis of rotation is translated into linear motion of the threaded adjustment mechanism along the axis of rotation, thereby adjusting the optical setting of the telescopic sighting device.

18. An apparatus according to claim **16**, wherein the spaced apart engagement features comprise spline structures.

19. An apparatus according to claim **16**, further comprising:

a biasing element configured to bias the actuator toward the locked position.

20. An apparatus according to claim **16**, wherein the pin member is disposed parallel to the axis of rotation and the actuator is configured to be moveable linearly along the axis of rotation between (1) a first axial position in which the pin member is in the locked position and (2) a second axial position in which the pin member is in the unlocked position.

21. An apparatus according to claim **16**, wherein the pin member is disposed transverse to the axis of rotation.

22. An apparatus according to claim **21**, wherein the actuator includes a cam surface aligned with the pin member and the actuator is rotatable about the axis of rotation between (1) a first rotational position at which the cam surface urges the pin member to the locked position and (2) a second rotational position at which the pin member is free to move into a recess of the cam surface and thereby into the unlocked position.

23. An apparatus according to claim **21**, wherein the actuator includes a circumferential groove disposed in proximity with the pin member and the actuator is configured to travel linearly along the axis of rotation between (1) a first axial position at which the circumferential groove is aligned with the pin member such that the pin member is free to move into the circumferential groove and thereby into the unlocked position and (2) a second axial position at which the circumferential groove is not aligned with the pin member and the actuator urges the pin member to the locked position.

24. An apparatus for driving an adjustment mechanism of a sighting device, wherein the adjustment mechanism is configured to adjust a setting of the sighting device, the apparatus comprising:

a locking member configured to be non-rotatably coupled to the sighting device, wherein the locking member includes a surface having a first set of spaced apart engagement features disposed thereon;

a rotatable member disposed in proximity to the locking member, wherein the rotatable member includes an axis of rotation and is configured to be in operative association with the adjustment mechanism of the sighting device such that rotation of the rotatable member about the axis of rotation drives the adjustment mechanism to adjust the setting of the sighting device; and

an actuator coupled to the rotatable member such that the actuator rotates about the axis of rotation along with the rotatable member, wherein the actuator includes a surface having disposed thereon a second set of spaced apart engagement features configured to be engageable with the first set of spaced apart engagement features and the actuator is configured to be moveable linearly along the axis of rotation between (1) a locked axial position in which the first and second sets of spaced apart engagement features are engaged such that the rotatable member is restrained from rotation about the axis of rotation and (2) an unlocked axial position in which the first and second sets of spaced apart engagement features are disengaged such that the rotatable member is rotatable about the axis of rotation relative to the locking member,

whereby an external force applied to the actuator causes the actuator to move to the unlocked axial position so that the actuator is rotatable about the axis of rotation for adjusting the setting of the sighting device.

25. An apparatus according to claim **24**, wherein the sighting device comprises a telescopic sighting device and the setting comprises an optical setting.

26. An apparatus according to claim **25**, wherein the rotatable member includes a threaded portion centered on the axis of rotation, the rotatable member is restrained from traveling linearly along the axis of rotation, and the adjustment mechanism of the telescopic sighting device comprises a threaded adjustment member configured to be threaded to the rotatable member and restrained from rotating about the axis of rotation so that rotation of the rotatable member about the axis of rotation is translated into linear motion of the threaded adjustment member along the axis of rotation, thereby adjusting the optical setting of the telescopic sighting device.

27. An apparatus according to claim **25**, wherein the first and second sets of spaced apart engagement features comprise spline structures.

28. An apparatus according to claim **25**, further comprising:

a biasing element configured to bias the actuator toward the locked axial position.

29. An apparatus according to claim **25**, wherein the actuator is configured such that the actuator moves further away from the telescopic sighting device when the actuator transitions from the locked axial position to the unlocked axial position, whereby the optical setting of the telescopic sighting device is adjustable by moving the actuator linearly along the axis of rotation away from the telescopic sighting device and rotating the actuator about the axis of rotation.

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